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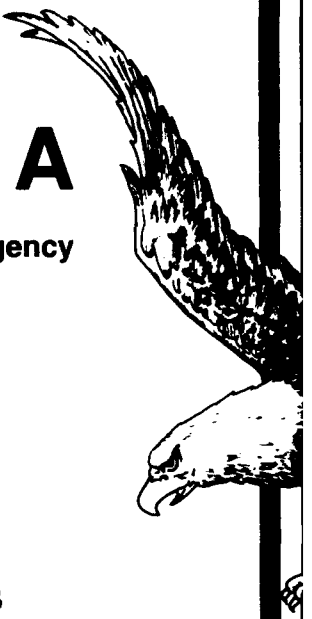

Report of Sampling and Analysis Results

Patrick Henry Army Housing Units Newport News, Virginia

August 1990

Prepared for:

U.S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
Aberdeen Proving Ground
Maryland 21010-5401

Prepared by:

WESTON® MANAGERS DESIGNERS/CONSULTANTS

Under the supervision of:

Environmental Assessment and
Information Sciences Division
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Argonne, Illinois 6043?

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Roy F. Weston, Inc. has conducted a sampling and analysis program of the Army housing property located in Newport News, Virginia. The objectives of this effort include further characterization of environmental contamination identified in an enhanced preliminary assessment carried out in 1989. The specific activities performed at this site were identification, evaluation of the condition, and collection of samples from specific suspected asbestos-containing materials, including floor tiles, pipe run and pipe fitting insulation, dust in the ductwork, and exterior siding, where present. These evaluations were necessary to clarify potential environmental issues identified in the earlier report, prior to the sale or realignment of the property.

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SAMPLING AND ANALYSIS AT THE U.S. ARMY
FAMILY HOUSING UNIT (FHU) PROPERTY
PATRICK HENRY, VIRGINIA

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SAMPLING AND ANALYSIS AT THE U.S. ARMY FAMILY HOUSING UNIT (FHU) PROPERTY PATRICK HENRY, VIRGINIA

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EXECUTIVE SUMMARY

The U.S. Army family housing units (FHUs) at Patrick Henry, Virginia were inspected by Roy F. Weston, Inc. (WESTON) personnel during February 1990 to further evaluate the environmental concerns identified in the enhanced Preliminary Assessment reports prepared and submitted earlier by Argonne National Laboratory (ANL) for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). Three of the 14 single-family "Capehart" housing units were examined on 23 February to investigate the possible presence of asbestos-containing materials (ACM). An assessment of airborne asbestos exposure was performed at one unit on this property on 01 May 1990 by a WESTON Certified Industrial Hygienist (CIH), because asbestos fibers were detected in the dust deposited within the ductwork of the heating system.

The ANL Draft Sampling and Analysis Plan, Revision 1 (SAP) specified sampling the following materials, where present, which are suspected to contain asbestos, from ten per cent of the housing units or a minimum of three housing units, whichever is greater.

- Pipe run insulation.
- Dust accumulated inside heating ductwork within the concrete slab, where present and open.
- Vinyl floor tiles.

The WESTON personnel selected three housing units for inspection after review of maintenance records and drawings, discussions with housing management personnel, and determination that the units were in similar condition. The housing units chosen, Nos. 006, 008, and 013, were considered to be representative of the other 11 units, but this was not confirmed by an examination of all the units.

Twelve dust samples, three samples of vinyl sheeting, nine samples of pipe run and fitting insulation, and three samples of cardboard duct were collected by WESTON and analyzed. These analyses revealed that asbestos is present in dust accumulated within the heating ductwork, in the pipe run insulation, and vinyl sheeting at the three housing units examined. Asbestos was found in ten of the 12 dust samples by transmission electron microscopy (TEM), and in at least two samples from each unit. Asbestos was quantified at 15% or greater by polarized light microscopy (PLM) in two of the vinyl sheeting samples. Asbestos was quantified at 1% or greater by PLM in five of the pipe run insulation samples. No asbestos was found by PLM analysis in the three cardboard duct samples collected. During the asbestos sampling activities, other suspect materials observed were expansion joints on the heating unit ducts.

The following practices should be observed with regard to the known and suspected asbestos-containing materials identified:

- The most significant risk of asbestos exposure to occupants is presented by the friable asbestos-containing pipe run insulation. All damaged material should be repaired or removed in a planned, properly executed program, as soon as practical. If repairs are made, rather than removal, an Operations and Maintenance (O&M) Plan should be developed and implemented. This plan must describe the locations of all known ACM, procedures for its maintenance, repair and removal, and personnel responsible for its implementation. The O&M plan must remain in force until such time as all ACM is removed from the facility.

- The risks posed by the asbestos-containing dust in the ductwork cannot be clearly evaluated, because the sampling and analysis program only included a qualitative screening of this material since no approved quantitative procedure exists. Further studies, such as air sampling, were recommended to determine if the asbestos is becoming airborne and to define what risks, if any, are presented by these findings. This action was taken and the findings are included in this report.

- The vinyl sheetings pose no significant risk as long as they are in good condition and are not damaged by excessive wear or misuse. They should be managed in place under an O&M program which describes procedures for the regular inspection of the floor coverings and the removal and replacement of any that become damaged.

Samples for airborne asbestos were collected from four floor vents, one located in each of the living room, kitchen, bedroom, and bathroom, in an unoccupied unit which had been inspected previously. The air samples were subjected to analysis by TEM to identify and quantify any asbestos fibers collected. The sample volumes collected resulted in detection limits for air airborne asbestos fiber concentrations of <0.005 fibers per cubic centimeter (f/cc). No airborne asbestos fibers were detected at this FHU property, by sampling techniques designed to approximate worst-case concentrations.

One Army-owned transformer was identified on the site. Discussions with DEH personnel revealed that this transformer had been sampled previously, and a copy of the laboratory report was obtained. The transformer is classified as a PCB-contaminated device, according to EPA regulations.

SECTION 1. INTRODUCTION

SAMPLING AND ANALYSIS AT THE U.S. ARMY FAMILY HOUSING UNIT (FHU) PROPERTY PATRICK HENRY, VIRGINIA

SECTION 1. INTRODUCTION

Roy F. Weston, Inc. (WESTON) was retained by Argonne National Laboratory (ANL) to provide assistance in gathering additional environmental data for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) at 53 family housing unit (FHU) properties in 12 states. The Patrick Henry, Virginia property is one of these FHUs.

1.1 PURPOSE AND SCOPE

The purpose of this project was to provide the Department of the Army with sound environmental data on the properties which are scheduled for sale or realignment as a result of the Defense Authorization Amendments and Base Closure and Realignment Act (Public Law 100-526). Environmental assessments of each property covered by the Act are required by the Secretary of Defense prior to their closure or realignment. Such actions must be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA) to ensure that any environmental hazards will be identified and mitigated where required.

Previously, ANL conducted enhanced preliminary assessments (PAs) for each property. These enhanced PAs made recommendations regarding sampling and analysis to determine (1) whether and in what quantities asbestos is present in certain building construction materials (including pipe run insulation, dust accumulated in heating ductwork, vinyl floor tile, and exterior siding shingles, where present), (2) in selected contexts, whether and in what concentration soils and groundwater may be contaminated, and (3) whether and in what range transformer oils at selected sites may contain polychlorinated biphenyls (PCBs). WESTON gathered this data by implementing ANL's Draft FHU Sampling and Analysis Plan, Revision 1 (SAP). Subsequent to the initial studies, WESTON, ANL, and USATHAMA decided that a follow-up effort was required to determine if asbestos fibers were becoming airborne from the dust in the heating system. This study was implemented, and samples were collected to evaluate any risks to occupants from this source.

1.2 SITE DESCRIPTION

The Patrick Henry housing area is located at the intersection of Jefferson Avenue (Rt. 143) and Bland Boulevard, at the entrance to Patrick Henry Airport in Newport News, Virginia. The housing area consists of 14 single-family units surrounded by a chain-link fence. It is located among 11 wooded acres of tall pine trees. The property lies within a mile of the Hampton Roads Sanitary Commission, and is surrounded by an office complex, light industry, and commercial concerns.

The three-bedroom "Capehart"-style single-family housing units were constructed in 1956. The single-story, wood-frame units were built on concrete slab foundations with no basements or crawl spaces. The ducts for the original heating system and domestic water lines were embedded in the concrete slab, which was covered with vinyl floor coverings. The units have pitched roofs surfaced with asphalt shingles and exteriors finished with vinyl siding.

1.3 REPORT ORGANIZATION

This report contains the results of the sampling and analysis program performed by WESTON. Section 2 contains a description of the asbestos sampling performed at the property and laboratory results for samples of suspected asbestos-containing material (ACM) collected. Copies of field notes and laboratory results pertaining to asbestos are provided in Appendices A.1 and A.2. Section 3 presents a description of the field sampling activities and results of the analyses for airborne asbestos fibers. Field notes and copies of the laboratory reports for this effort are presented in Appendices B.1 and B.2, respectively. Section 4 contains a description of field activities and the findings from the transformer evaluations. Copies of field notes and supporting data for this effort are included in Appendix C. Section 5 is a summation of all activities and findings for the Patrick Henry site.

SECTION 2. ASBESTOS-CONTAINING MATERIALS

SECTION 2. ASBESTOS-CONTAINING MATERIALS

WESTON personnel inspected three of the 14 "Capehart" units at the Patrick Henry family housing facility on 23 February 1990 for the presence of suspected ACM. Vinyl sheeting, pipe run and fitting insulation, dust accumulated within the heating ductwork, and cardboard duct were the only suspect materials found within the buildings and sampled. All sampling was done following the requirements of ANL's SAP. Additionally, all field work was performed in accordance with applicable Federal regulations, including 40 CFR Part 61 Subpart M, 40 CFR Part 763 Subpart E, and 29 CFR Part 1910.1001.

2.1 SAMPLING RATIONALE

The sampling rationale used by WESTON for this project followed the recommendations set forth by ANL. The type of suspect ACM to be sampled, the number of housing units to be examined at each FHU facility, and number of samples to be taken for each material found were described in the SAP. The plan for Patrick Henry required sampling of the following materials, if present:

- Pipe run insulation.
- Accumulated dust inside heating ductwork if not sealed.
- Vinyl floor tiles.

In accordance with the SAP, three units were examined at this facility. The sampling plan, however, did not identify specific units which were to be sampled. The task of determining which housing units were representative of the facility as a whole and, therefore, would be sampled was left to the WESTON field team. After reviewing all available maintenance records and drawings and discussing the facility with Directorate of Engineering and Housing (DEH) personnel, it was determined that all of the units at the Patrick Henry FHU were similar in condition. Units 006, 008, and 013 were chosen by the WESTON field team leader as representative units to be sampled.

The SAP specifies that a minimum of two pipe run insulation samples, four dust samples, and one sample of each color of floor tile be collected from each of the housing units examined. Twelve dust samples, three samples of vinyl sheeting, and nine samples of pipe run and fitting insulation were collected at the facility. In addition, three samples of cardboard duct were collected.

2.2 FIELD ACTIVITIES AND OBSERVATIONS

Each of the units was inspected to determine if suspect materials were present. The samples of the pipe run and fitting insulation were retrieved using a disposable coring device with a one-half inch diameter tube, designed such that the coring device also serves as the sampling container. Before the coring tool was inserted, the materials to be sampled were moistened to prevent asbestos fibers from becoming airborne. The coring device was placed in its outer sample container and secured by a tight fitting lid. The containers were labeled with sample numbers, and shipped to the lab. The sampling tools were wiped clean with a damp cloth and all debris resulting from the sampling activities as collected and placed into plastic bags. The small bore hole was sealed with an encapsulant.

One sample of pipe fitting insulation and two samples of pipe run insulation were taken from each unit. The pipe run and fitting insulation is friable, as defined in the EPA regulations, meaning that it can be crushed,

crumbled, pulverized, or otherwise reduced to a powder using hand pressure. Friable ACM are considered to be more hazardous than non-friable ACM since they are much more likely to release asbestos fibers. Because of its friability and instances of damage, the pipe run and fitting insulation is considered to be the most hazardous type of ACM in the FHU.

Heating ductwork vents in the units were not sealed, so dust samples were collected by wiping the inner surface of the duct near the designated exhaust vents with a fiber-free wipe selected for its ability to trap dust in a non-fibrous matrix. Each wipe was placed in the jaws of a flexible small parts pick-up tool and moistened with fiber free water. The grille was then removed and the tool inserted into the duct opening. The interior surface was wiped to collect dust on the moistened surface of the wipe. After the dust was gathered, the wipe was placed in a small plastic wide-mouth jar, sealed, labeled with the sample number, and shipped to the lab. The grille was then replaced and the tool was cleaned by rinsing and wet wiping the surfaces prior to collecting the next sample. Samples were collected from the living room, kitchen, bedroom, and main bathroom in all three units.

One color (white) vinyl sheeting was sampled in each unit resulting in a total of three samples for laboratory determination of asbestos content. These samples were taken by breaking off a small piece of sheeting in an inconspicuous location. About one square inch of the sheeting surface area was taken for each sample. No effort was made to separate the mastic, which sometimes contains asbestos, from the vinyl sheeting samples.

The vinyl sheeting in all three of the units inspected was in good condition. This material is considered to be a non-friable type of ACM, unless damaged. If significant damage occurs, such that the material becomes friable as defined in the asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP), the U. S. Environmental Protection Agency (EPA) would classify these tiles as friable materials. However, an EPA interpretation was recently released that changes certain previous interpretations regarding non-friable ACM. On 23 February 1990, a memorandum was issued by the Director of Emissions Standards Division, the Director of Stationary Source Compliance Division, and the Associate Enforcement Counsel for Air Enforcement of the EPA Office of Air Quality Planning and Standards (OAQPS). This memorandum was circulated to other air quality officials and EPA regional offices in early March 1990. This latest position states that floor tiles and certain other non-friable materials do not have to be removed from a facility prior to demolition, unless they are severely damaged and thus are considered friable, or unless the demolition may cause fiber release through grinding or abrasion of the tiles. Vinyl sheeting tile removal shall be done if demolition is to be accomplished by burning, either of the unit or of the debris from demolition. However, if the floors in the housing units are to be renovated, special care must be taken during the process to prevent the release of asbestos fibers.

The WESTON field team was directed, as a part of the project scope contained in the SAP, to perform sampling and analysis of specific suspect ACM. However, WESTON noted that the duct material in the floors appeared to be a cardboard-like tube rather than concrete asbestos pipe. Three samples of this material were collected by cutting a small piece from the exposed edge at a floor register and analyzed by PLM. Other suspect materials observed were expansion joints on the heating units. Copies of the field notes are included in Appendix A.1.

2.3 LABORATORY PROCEDURES AND RESULTS

The bulk samples of building materials were analyzed for asbestos content by WESTON's optical microscopy laboratory in Auburn, Alabama. This laboratory is accredited by the American Industrial Hygiene Association (AIHA) and the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). The bulk samples were analyzed by Polarized Light Microscopy (PLM) using the EPA's "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M4-82-020, December 1982. Copies of the laboratory reports are included in Appendix A.2.

Vinyl sheeting samples for which no asbestos was found using PLM methods and wipe samples of dust accumulated within heating ductwork were analyzed qualitatively for the presence of asbestos by Transmission Electron Microscopy (TEM) at WESTON's NVLAP accredited electron microscopy laboratory in Auburn, Alabama. Copies of these laboratory reports are also included in Appendix A.2.

All analyses were performed in accordance with protocols set forth in the Laboratory Accreditation package submitted by WESTON under NVLAP. This document includes standard procedures for sample analysis and quality assurance / quality control (QA/QC) which were acceptable to NIST. The QA/QC protocols for the laboratory differ significantly from those commonly found in chemical analysis procedures, due to the nature of the analytical procedure. Since there are no reagents, digestions, or other steps in the process that provide significant opportunities for sample contamination or analyte loss, lot blanks and sample spikes are not performed. Instead, all analyses are performed using the following steps:

- Incoming samples are divided into lots of ten for analysis.
- One sample is selected at random to serve as the QC check and divided into two containers.
- The sample lot is assigned to an analyst who determines the asbestos content of each sample.
- The QC sample is analyzed by a different analyst, designated by the sample custodian.
- The results of both analysts are submitted to the QC Coordinator for review, and comparison to the laboratory QC chart.
- The results are reviewed and approved, based on the written QC review procedures, or rejected. If rejected, the sample lot and QC sample are reanalyzed.

The WESTON laboratory routinely runs blank checks to ensure that equipment and refractive index oils are not contaminated, collects and analyzes samples of the air in the work areas to document that airborne asbestos fibers do not threaten worker health or contaminate samples, and analyzes samples submitted by NIST to document precision of results as required by the NVLAP program. Samples provided in past rounds of proficiency checks are used for analyst training and to document analyst proficiency. The use of third party laboratory comparisons is often done, and is accomplished by sending duplicates of samples to an outside laboratory and comparing the results obtained by the two facilities.

In interpreting the asbestos results, it should be noted that the definition of asbestos presence differs between the EPA and some state agencies. According to the EPA definition, any materials that contain greater than one per cent (>1%) asbestos are classified as ACM by the 1977 NESHAP regulations. However, the State of California has recently implemented state regulations that consider all materials containing 0.1 per cent or more asbestos as asbestos-containing. It is believed that several other states will soon follow the lead of California in lowering the threshold limit to 0.1 per cent, including some in which properties under review in this study are located. Currently the State of Virginia continues to abide by the EPA definition, hence, all samples containing >1% asbestos are considered to be ACM.

The matter is further complicated by the fact that the PLM method was developed specifically for friable materials, but not for non-friable types of suspect ACM such as vinyl floor tiles, vinyl sheeting, and siding. In fact, no specific method has been developed and promulgated to date for such samples, so laboratories use PLM as the only available documented procedure for their analysis. PLM has an inherent limitation on fiber resolution of about 0.25 micrometer (um) in diameter, while reliable detection and quantification of fibers smaller than 1 um in diameter is difficult. The manufacturing process for vinyl floor tiles, for example, often produces the very small fiber diameters which cannot be seen by PLM. WESTON's experience is that frequently such samples do, in fact, contain significant quantities of asbestos. WESTON has developed a qualitative technique using TEM to detect the presence of such small fibers and minimize false negatives in the laboratory results. This technique, however, does not allow a good quantitative estimate of asbestos content.

For these reasons, the WESTON laboratories have implemented a policy of reporting asbestos presence as follows:

- Asbestos determined by PLM to be present at greater than 1% is reported as the quantity detected.
- If asbestos is estimated to be less than 1% by PLM, it is reported as "<1%". This estimate of asbestos content may be made when only one asbestos structure is observed.
- If asbestos is not detected in certain non-friable materials by PLM, then the samples are subjected to TEM analysis. The results are reported as positive if asbestos is detected by TEM.

Recommendations made in this report are based on the >1% regulatory limit, except for floor tiles as discussed earlier and except as otherwise noted. However, all samples in which asbestos was detected are discussed. This represents a conservative approach to the assessment of asbestos presence at the facility.

Table 2.1 contains a summary of all samples collected at the Patrick Henry FHU, including sample locations, material descriptions, and laboratory results. PLM results are quantitative while TEM results are qualitative. Quantity estimates for materials sampled that were suspected to contain asbestos are presented in Table 2.2. The field notes describing the observations are provided in Appendix A.1, while copies of the original laboratory reports are included as Appendix A.2.

Five of the nine pipe run and fitting insulation samples were found to contain the chrysotile type of asbestos in a friable form at or greater than 1% using the PLM technique for analysis. Based on these observations, the pipe run insulation should be considered to contain asbestos.

TABLE 2.1
BULK SAMPLE SUMMARY
PATRICK HENRY FAMILY HOUSING

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	ASBESTOS CONTENT PLM ANALYSIS	CONFIRMATION TEM ANALYSIS
Unit 008				
BY249-44-VA-008-ATD	Dust within ductwork	Bathroom	---	Positive
BY250-44-VA-008-ATD	Dust within ductwork	Bedroom	---	Positive
BY251-44-VA-008-ATD	Dust within ductwork	Living room	---	Positive
BY252-44-VA-008-ATD	Dust within ductwork	Dining room	---	Positive
BY253-44-VA-008-API	Pipe fitting insulation	Heater room, Attic	None Detected	
BY254-44-VA-008-API	Pipe fitting insulation	Heater room, Attic	None Detected	
BY255-44-VA-008-API	Pipe run insulation	Heater room, Attic	Chrysotile, 10%	
BY256-44-VA-008-AFT	White vinyl sheeting	All rooms	Chrysotile, 25%	
BY257-44-VA-008-ATD	Pressed cardboard duct	Bedroom	None Detected	
Unit 006				
BY258-44-VA-006-ATD	Dust within ductwork	Bathroom	---	Negative
BY259-44-VA-006-ATD	Dust within ductwork	Bedroom	---	Positive
BY260-44-VA-006-ATD	Dust within ductwork	Living room	---	Positive
BY261-44-VA-006-ATD	Dust within ductwork	Kitchen	---	Positive
BY262-44-VA-006-AFT	White vinyl sheeting	All rooms	Chrysotile, 15%	
BY263-44-VA-006-ATD	Pressed cardboard duct	Bedroom	None Detected	
BY264-44-VA-006-API	Pipe fitting insulation	Heater room, Attic	None Detected	
BY265-44-VA-006-API	Pipe run insulation	Heater room, Attic	Chrysotile, 2%	
BY266-44-VA-006-API	Pipe run insulation	Heater room, Attic	Chrysotile, 2%	
Unit 013				
BY267-44-VA-013-ATD	Dust within ductwork	Bathroom	---	Negative
BY268-44-VA-013-ATD	Dust within ductwork	Bedroom	---	Positive
BY269-44-VA-013-ATD	Dust within ductwork	Living room	---	Positive
BY270-44-VA-013-ATD	Dust within ductwork	Kitchen	---	Positive
BY271-44-VA-013-AFT	White vinyl sheeting	All rooms	None Detected	Negative
BY272-44-VA-013-ATD	Pressed cardboard duct	Bedroom	None Detected	
BY273-44-VA-013-API	Pipe fitting insulation	Heater room, Attic	None Detected	
BY274-44-VA-013-API	Pipe run insulation	Heater room, Attic	Chrysotile, 2%	
BY275-44-VA-013-API	Pipe run insulation	Heater room, Attic	Chrysotile, 1%	

TABLE 2.2
ASBESTOS CONTAINING MATERIALS
PATRICK HENRY FAMILY HOUSING

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	QUANTITY	UNITS
Unit 008				
BY249-44-VA-008-ATD	Dust within ductwork	Bathroom	N/A	
BY250-44-VA-008-ATD	Dust within ductwork	Bedroom	N/A	
BY251-44-VA-008-ATD	Dust within ductwork	Living room	N/A	
BY252-44-VA-008-ATD	Dust within ductwork	Dining room	N/A	
BY255-44-VA-008-API	Pipe run insulation	Heater room, Attic	45	Linear ft
BY256-44-VA-008-AFT	White vinyl sheeting	All rooms	940	Square ft
Unit 006				
BY259-44-VA-006-ATD	Dust within ductwork	Bedroom	N/A	
BY260-44-VA-006-ATD	Dust within ductwork	Living room	N/A	
BY261-44-VA-006-ATD	Dust within ductwork	Kitchen	N/A	
BY262-44-VA-006-AFT	White vinyl sheeting	All rooms	940	Square ft
BY265-44-VA-006-API	Pipe run insulation	Heater room, Attic	35	Linear ft
BY266-44-VA-006-API	Pipe run insulation	Heater room, Attic	N/A	
Unit 013				
BY268-44-VA-013-ATD	Dust within ductwork	Bedroom	N/A	
BY269-44-VA-013-ATD	Dust within ductwork	Living room	N/A	
BY270-44-VA-013-ATD	Dust within ductwork	Kitchen	N/A	
BY274-44-VA-013-API	Pipe run insulation	Heater room, Attic	35	Linear ft
BY275-44-VA-013-API	Pipe run insulation	Heater room, Attic	N/A	

Two of the vinyl sheeting samples were found by PLM to contain asbestos at or greater than 15%. The 11 units not inspected should be considered to have ACM present in the vinyl sheeting unless additional sampling and analysis is performed and shows that no asbestos is present in these units.

Analytical results for the dust samples taken from the heater ductwork indicate that this dust contains some asbestos fibers. Qualitative TEM analyses revealed the presence of asbestos in ten of the 12 dust samples. At least two samples from each unit had detectable asbestos fibers. These data lead to the conclusion that asbestos is found in the dust trapped by the heating ducts.

No asbestos was found in the samples of the cardboard duct material collected in the three units examined. Other suspect materials noted were expansion joints on the heating units.

2.4 CONCLUSIONS AND RECOMMENDATIONS

The sample analyses performed by WESTON have revealed that asbestos is present in most vinyl sheeting and pipe run insulation samples collected in the three housing units examined and that the dust inside the heater supply ducts contains asbestos. These units are thought to be representative of the other 11 at the site, but this was not confirmed by sampling all units. Results of the cardboard duct indicated that asbestos was not present in any of the three samples taken.

Analytical results of the pipe run and fitting insulation confirmed that asbestos is present in the pipe run insulation samples taken. The insulation should be remediated in those units were asbestos-containing pipe run insulation is damaged by repairing damaged areas and encapsulating the friable materials, or by complete removal prior to sale or realignment. If repairs are made, rather than removal, an O&M plan should be developed and implemented. An O&M plan must address the following:

- The locations of all known and suspected ACM.
- The procedures and frequency for periodically assessing the ACM in the facility.
- The procedures for safely handling the ACM during maintenance or removal activities.
- Designation of an asbestos coordinator for the facility.
- The responsibilities and requirements for training of personnel involved with maintenance and renovation of the facility.
- The record-keeping program for the facility.

All of the asbestos-containing pipe run insulation must be removed prior to a planned renovation of the plumbing system or demolition of the units.

The asbestos dust accumulated within the heating ductwork represents an unusual problem, since the source of this asbestos is not readily apparent, and the quantity is not precisely known. As a conservative approach, the heating ductwork located within the concrete slab should be cleaned or permanently sealed when the units are renovated. Since the heating systems are currently operational, sealing the floor vents will require replacement with attic ducts and ceiling vents, or provisions of an alternate heating source. If the ducts are

cleaned, a high-powered vacuum cleaner equipped with a high-efficiency particulate air (HEPA) filter should be employed, since other vacuum cleaners are not capable of trapping all of the small asbestos fibers that may be present.

The source of the asbestos in the ducts cannot be positively determined, due to the sampling and analysis procedures employed. However, there are several potential sources, based on observations at the numerous facilities inspected during this project. Units, presumed to be the original heaters, found at other facilities frequently contained an expansion joint which served to isolate the return air plenum from the heater itself, preventing the transmission of vibrations and noise to the ductwork. The fabric-like material used to form this joint was determined, in some cases, to be chrysotile asbestos in a nearly pure form. It is possible, even likely, that the heating systems in these units had similar expansion joints which have been removed. During the 25 to 30 years that the original units were in service, erosion of these joints was likely, and could have caused asbestos fibers to accumulate in the dust.

Another possibility is that residual debris from the removal of vinyl-asbestos floor tiles, such as was found in other sites, may have been left in the ducts during floor tile removal and replacement. Conversations with the TEM analysis indicate that there was some evidence of chlorine observed during the identification of the asbestos fibers by X-ray dispersion analysis in samples from some sites. The most likely source of this element, considering the site history, is the vinyl chloride polymer which forms the floor tile matrix. However, other asbestos sources, such as debris imported into the facilities from outside activities of the occupants, cannot be ruled out.

The vinyl sheeting in the three housing units inspected were in good condition, but, should they become broken or damaged, asbestos fibers may be released. The recent EPA clarification of the definition for damaged non-friable materials apparently removes some concerns about the status of these materials at the time of renovation or demolition. Inspection of these normally non-friable materials prior to demolition is required, but, if they are in good condition at the time, they may be left in place as long as planned demolition procedures will not release a significant amount of asbestos fibers. However, if demolition will subject these non-friable materials to grinding, sanding, or abrading, or if demolition involves burning of the structure or debris from the structure, all forms of ACM, including these floor sheetings, must be removed in advance.

The vinyl sheeting should be left in place and managed under an O&M plan. The sheetings should be removed during a planned renovation of the units, in accordance with the regulations applicable at the time.

Although expansion joints were the only other suspect materials noted, care should be taken during renovations or demolition to identify suspect materials that may have been hidden from the view of the assessment team. The suspect materials observed by the field team, and any hidden suspect materials found later, should be analyzed for the presence of asbestos prior to being disturbed.

SECTION 3. AIRBORNE ASBESTOS ASSESSMENT

SECTION 3. AIRBORNE ASBESTOS ASSESSMENT

Sampling for airborne asbestos fibers was performed at one unit of the Patrick Henry, Virginia FHU on 01 May 1990 by WESTON. Dr. Leonard Nelms, a Certified Industrial Hygienist (CIH) visited the site and collected the samples using procedures described in the Asbestos Hazard Emergency Response Act (AHERA). These procedures were designed for verifying that clean-up of a contained area, following completion of an asbestos abatement action in public schools, was adequately performed. All samples were analyzed by TEM following the protocols specified in AHERA.

3.1 SAMPLING RATIONALE

WESTON followed the procedures and guidelines set forth during discussions among ANL, USATHAMA, and WESTON staff members, to provide a fast-track field sampling program and rapid analysis of samples collected. The urgency of this effort was driven by the finding that asbestos fibers were a component of the dust contained in the sub-slab ductwork of a number of the installations. The approach chosen required that the WESTON CIH collect four samples of air from selected heating registers, generally from one in each of the living room, kitchen, bedroom, and bathroom. Air samples were to be collected in one unoccupied unit at the site while the heating system was operating, to simulate the worst possible case for exposure of occupants. The vacant unit selected was to be one of those from which dust within ducts had been sampled during the initial investigations, where possible. If no unit that had been sampled previously was vacant at the time, another unit was to be chosen from among those available, and samples of dust from the ducts were to be collected. These samples were to be collected after completion of sampling for airborne fibers, using the procedures employed previously. Unit 13 was selected at the Patrick Henry site, since it was vacant and had previously been sampled.

3.2 FIELD ACTIVITIES AND OBSERVATIONS

The sampling activities at this site were performed during the late morning and afternoon, on a warm spring day. The diaphragm pumps were unpacked, placed in the selected sampling locations, and turned on as soon as possible after arrival at the site to allow the mechanical components to warm up prior to checking flow rates. Since there was no floor duct in the kitchen or the bathroom of this unit, samples were taken from wall vents instead. The heating system was turned on as soon as the pumps were in operation, to allow the air flow to stabilize, since it had not been in operation recently.

A test filter cassette, identical to those used for sample collection, was placed on the pump system being calibrated and the airflow into the filter was measured using a calibrated rotameter. This followed AHERA requirements and good industrial hygiene (IH) sampling protocols. After the pumps were calibrated, a sampling cassette made of an electrically conducting plastic was attached to the sample line, placed directly over the heating register to be sampled, and securely held in place with duct tape. The cassette contained a 25 mm diameter mixed cellulose ester (MCE) membrane filter, having a nominal pore size of 0.45 um. The time at which sample collection was begun was recorded and the air was sampled for approximately three hours.

The pumps were operated for a length of time sufficient to draw about 1,600 liters (L) of air through each filter, based on the initial daily calibration. At the expiration of this time, the filter cassettes were removed from the heating register, inverted while the airflow continued, and lightly tapped to dislodge any

fibers that may have adhered to the cowling of the cassette. Then, the cassettes were carefully removed from the sampling pump, resealed with the plugs and end caps that are a part of the cassettes, and labeled. The flow rate of each pump was again determined by exactly the same procedure used prior to the start of sample collection. After all sampling was completed, the heating system was returned to the same condition and setting that was found on entry to the unit.

The volume of air drawn through each filter was calculated, based on the average sample flow rate and the duration of sample collection, and recorded on the cassette label. Each cassette was then sealed in a anti-static plastic zipper-seal bag and placed in a shipping carton with a custom-designed anti-static foam liner. All sampling equipment, samples and other gear were then removed from the unit and the site was secured prior to departure.

Samples were collected from the four interior locations selected. The kitchen and bathroom vents were located in the wall, near the ceiling, rather than near the floor. In addition, a field blank was prepared and a background sample of ambient outside air was taken near the outside storage room at the entry door to the kitchen. No significant problems were encountered during the sample collection activities.

During the sampling effort the facility was examined to identify any potential sources of asbestos that may be responsible for the asbestos fibers found in the dust. The heating system has a expansion joint that appeared to have been in place for some time. This type of material sometimes contains asbestos. However, the heating ducts themselves are a fibrous material that does not contain asbestos, according to the lab results from sampling conducted previously.

3.3 LABORATORY PROCEDURES AND RESULTS

Samples were shipped to the laboratory soon after collection by common carrier. The four samples of air from within the unit were analyzed by WESTON's NVLAP-accredited TEM facility, using the sample preparation and analytical procedures set forth in the EPA AHERA method. A section of the exposed filter was cut from each sample and three wedges were placed on copper wire grids for TEM mounting. The samples were etched in a plasma asher, which also destroyed some of the organic materials that may have been collected, and vacuum-coated with a thin layer of carbon, embedding the fibers that were on the filter surface. Each carbon-coated grid was placed in a Jaffe wick washer, in which the MCE filter matrix was dissolved and wicked away, leaving behind the carbon film containing any asbestos fibers collected. The grids were then examined and found to be ready for analysis.

Once the sample grids were prepared, each grid was examined by the TEM protocols of AHERA. A specified number of grid openings were scanned looking for fibers that may be asbestos. Typically, between six and ten grid openings had to be examined to comply with the detection limits set forth in the regulations. Whenever a fiber was observed during this examination, the microscopist examined its morphology and determined its elemental composition from the emitted X-ray spectrum. If these indicated that it may be an asbestiform mineral, the crystal lattice structure was examined by observation of its electron diffraction pattern. The fiber was then classified as non-asbestos or by the type of asbestos determined to be present during the analysis, as appropriate.

The results for the four samples from inside Unit 13 are presented in Table 3.1. No asbestos fibers were detected in any of these samples at a limit of detection that was between 0.004 and 0.005 fibers per cubic centimeter (f/cc). Based on these findings, the background sample and field blank were not examined, since no fibers were detected inside the unit.

3.4 CONCLUSIONS AND RECOMMENDATIONS

The air samples collected indicate that asbestos fibers from the dust found within the heating system ductwork are not being released in significant quantities at this facility. The airborne asbestos concentration was lower than the detection limit and below the AHERA threshold. The limits of detection were <0.005 f/cc, which is at or below the acceptability limit set forth in AHERA for clearance of an abatement area in a school, and were far lower than the OSHA Permissible Exposure Limit (PEL) for workers of 0.2 f/cc.

While asbestos has been shown to pose a health risk to humans at high fiber concentrations, there are no definitive studies that indicate that a risk is associated with low-level exposures such as the 0.005 f/cc AHERA limit. Therefore, sampling and analysis for airborne asbestos at this site did not reveal any health risk to the occupants of the houses, based on the TEM analyses of the samples collected. However, it is recommended by the U.S. Army Environmental Hygiene Agency (AEHA) that, if the units are to remain under the management, operational control, or ownership of the Army, additional sampling and analysis for airborne asbestos be undertaken. These studies should be performed to provide data from at least ten percent or a minimum of three of the housing units, whichever is greater. This additional sampling and analysis effort, along with the other recommended actions, will help to ensure that there is no long-term exposure risk to the occupants or to maintenance personnel.

TABLE 3.1. RESULTS OF AIRBORNE ASBESTOS SAMPLING AND ANALYSIS
(ALL VALUES IN FIBERS/CC)

SAMPLE NUMBER	SAMPLE LOCATION	ASBESTOS IN DUST	ASBESTOS CONCENTRATION	ASBESTOS TYPE FOUND
PH-13-LR	Living Room	YES	ND 0.004	ND
PH-13-KI	Kitchen	YES	ND 0.004	ND
PH-13-BR	Bedroom	YES	ND 0.004	ND
PH-13-BA	Bath Room	NO	ND 0.004	ND

ND = Not Detected at the Limit of Detection Cited.
Note: The asbestos in all dust samples was chrysotile.

SECTION 4. TRANSFORMER OILS

SECTION 4. TRANSFORMER OILS

The SAP required that WESTON obtain samples or other information concerning the transformers and insulating oils located on the Patrick Henry FHU facility. One Army-owned transformer was identified by the DEH personnel at the site. The oil in this transformer had been sampled by Power Systems Analysis in April 1989, and was found to contain 60 mg/kg of AROCLOR 1260, a PCB mixture. The transforme is classified as a PCB-Contaminated device, based on this analysis. No further transformer evaluation efforts were required at this site. A copy of the laboratory report obtained is provided in Appendix C.

This transformer should be listed in facility records as PCB-contaminated and periodically checked to ensure that it is not leaking. Current regulations permit continued use of the device. but it should be replaced with a non-PCB unit, if feasible, and disposed of properly. This action will eliminate a potential threat to the environment.

SECTION 5. SUMMARY OF FINDINGS

SECTION 5. SUMMARY OF FINDINGS

Sampling and analyses performed at the Patrick Henry, Virginia FHU reveal the presence of several issues of concern from an environmental standpoint. The most significant are the detection of asbestos in 10 of the 12 dust samples, five of the nine pipe insulation samples, and in two of three samples of vinyl sheeting.

The following practices should be observed with regard to the known and suspected asbestos-containing materials identified:

- The friable asbestos-containing pipe insulation presents the greatest concern at this site. While the general condition of this ACM is good, it can be damaged if mishandled. This material should be repaired as needed, encapsulated, and managed under an O&M Plan as long as it remains in place. A prudent course of action would be removal of this material and replacement with an asbestos substitute. This action should be done in accordance with state and Federal regulations.

- Additional sampling and analysis for airborne asbestos at this site is recommended by AEHA, if the units are to remain under the management, operational control, or ownership of the Army. These studies should be performed to provide data from at least ten percent or a minimum of three of the housing units, whichever is greater.

- The vinyl floor coverings pose no significant risk as long as they are in good condition and are not damaged by excessive wear or misuse. They should be left in place and managed under an O&M program which describes procedures for the regular inspection of the floor coverings and the removal and replacement of any that become damaged.

Investigation of the electrical supply system at the property revealed that the only transformer located on the property which may contain polychlorinated biphenyls (PCBs) had previously been sampled. This was verified in a letter and a copy of lab results supplied to WESTON by the DEH office. WESTON concludes that the transformer is a PCB-contaminated unit and does not require sampling. The transformer should be labeled as "PCB-contaminated" and monitored periodically to ensure that it is not leaking. While current regulations do not require removal of this transformer, its replacement by a non-PCB device would eliminate a potential risk to the environment.

The air monitoring performed in Unit 13 indicated that no detectable asbestos was being emitted in air from dust collected in the heating ducts. The detection limit of the method, <0.005 f/cc, is below the AHERA limit and well below the OSHA PEL of 0.2 f/cc.

APPENDIX A.1. FIELD DATA, ASBESTOS SAMPLING

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2204-13-01

FACILITY BLDG. NO. Patrick Henry FHA. #006

FACILITY CONTACT Dave Organ TELEPHONE NUMBER 804-378-2890

TECHNICIAN NAME L. Jaye SIGNATURE L. Jaye

TECHNICIAN NAME A. Busby SIGNATURE Arthur M. Busby

TIME ARRIVED 1030 TIME DEPARTED 1100 DATE 23 FEB 90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

Unit #6 is a 3-bedroom house with a pitched, shingle roof and aluminum siding. The heat is forced air-oil fire. A Suspect ACM expansion joint was noted in the heater room. Samples of dust in flour vents, pipe insulation, duct material and flooring were taken. House was empty and unoccupied at the time of inspection.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	9
Drawings Reviewed	n/A	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	3	Exp. Assess. Form Init.	✓

Q.A. Check ____ SIGNATURE ____ DATE ___/___/90
dd mmm yy

WESTON

ASBESTOS SURVEY DATA

059

BLDG. NO.: 0106
INSTALLATION 0414

TASK TEAM MEMBERS
L. Jaye
A. Busby

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: PATRICK HENRY FHU.
BLDG. DESCRIPTION: 3-bedroom pitch roof, alum siding

DATE (dd/mm/yy): 23/FEB/90
TIME ARRIVED: 1030

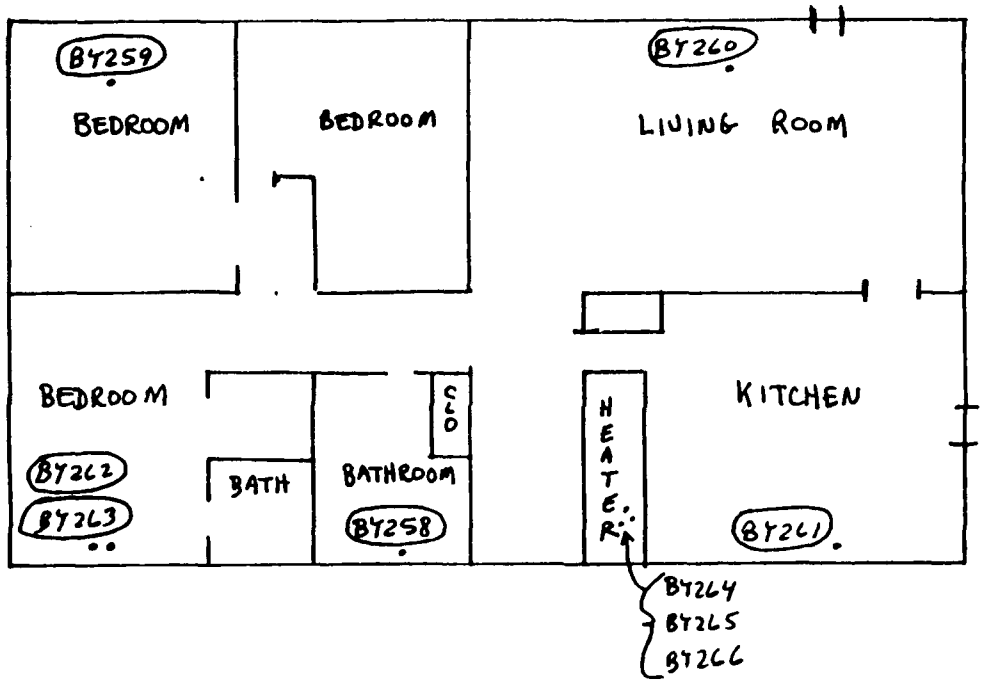
ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	SECTION
1.	BT1268	414	VA	0106	AITD	BATHROOM	1		10910A	C1
2.	BT1265	414	VA	0106	AITD	BEDROOM	1		10910A	C1
3.	BT1266	414	VA	0106	AITD	LIVING ROOM	1		10910A	C1
4.	BT1261	414	VA	0106	AITD	KITCHEN	1		10910A	C1
5.	BT1262	414	VA	0106	AIFT	BEDROOM	440		10910B	C2
6.	BT1263	414	VA	0106	AITD	BEDROOM	1		10910C	C3
7.	BT1264	414	VA	0106	APIP	HEATER ROOM	6	✓	10910D	C4
8.	BT1265	414	VA	0106	APIP	HEATER ROOM	15	✓	10910E	C5
9.	BT1267	414	VA	0106	APIP	HEATER ROOM	1	✓	10910E	C6
10.										C7
11.										
12.										

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	Dust samples in floor vents
02	White vinyl flooring all rooms (square feet)
03	Pressed cardboard ductwork
04	Cementitous fittings (each)
05	Pipe insulation (linear feet)
06	Same material as BT 265
07	Pipe insulation and fittings on water pipes in attic to bathroom (≈ 6 fittings & 20 LF.)

TECHNICIAN SIGNATURE Nola L Jaye

QUALITY ASSURANCE SIGNATURE

PATRICK HENRY #006



PATRICK HENRY, VA. FHA 3-BEDROOM

BLDG # 6

SITE # 44

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-[illegible]

FACILITY, BLDG. NO. PATRICK HENRY #205

FACILITY CONTACT Dave Organ TELEPHONE NUMBER 804-873-2892

TECHNICIAN NAME L. Jaye SIGNATURE L. Jaye

TECHNICIAN NAME A. Busby SIGNATURE A. Busby

TIME ARRIVED 1000 TIME DEPARTED 1030 DATE 23 FEB [illegible]
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

Unit 8 is a 3-bedroom house with a pitched shingle roof and aluminum siding. Heat is forced air oil fire. There was suspect ACM insulation in the heater room and attic. Flooring was sheet vinyl. Suspect ACM expansion joint noted on heating unit. Dust samples were taken from floor vents. House was empty and unoccupied at the time of our Survey.

All of the duct material in the floor is made of a material that looks like a very heavy card board pipe. The buildings are not too far above the water table and are suseptable to moisture damage. Mr. Organ said that the vent systems in alot of these homes have been filled with water at times and ~~have~~ has caused the pipes to fall apart and mildew.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	9
Drawings Reviewed	n/A	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	3	Exp. Assess. Form Init.	✓

Q.A. Check ____ SIGNATURE ____ DATE ____/____/90
dd mmm yy

WESTON

ASBESTOS SURVEY DATA

BLDG. NO.: 0018
INSTALLATION 0414

TASK TEAM MEMBERS
L. Jaye
A. Busby

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL AE

BLDG. NAME: PATRICK HENRY FHU
BLDG. DESCRIPTION: 3 bdr, pitched roof, alum siding

DATE (dd/mm/yy): 23/FEB/90
TIME ARRIVED: 1002

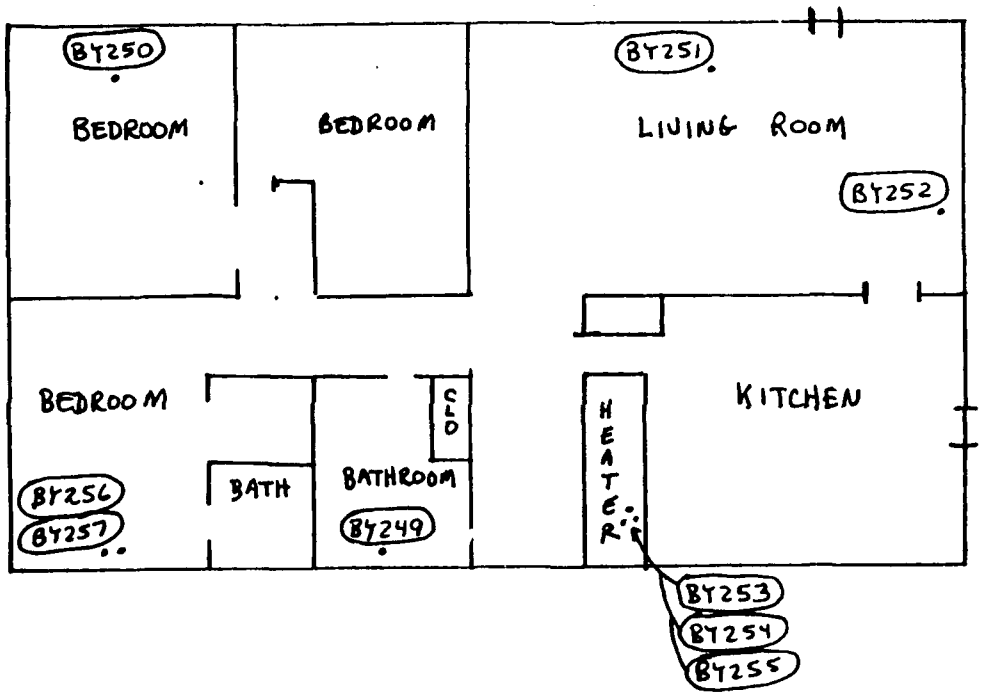
ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	B4T124A	414	VA	0018	AIID	BATHROOM			1089A	01
2.	B4T2510	414	VA	0018	AIID	BEDROOM			1089A	01
3.	B4T2511	414	VA	0018	AIID	LIVING ROOM			1089A	01
4.	B4T2512	414	VA	0018	AIID	DINING ROOM			1089A	01
5.	B4T2513	414	VA	0018	AIPI	HEATER ROOM	16	✓	1089B	02
6.	B4T2514	414	VA	0018	AIPI	HEATER ROOM		✓	1089B	03
7.	B4T2515	414	VA	0018	AIPI	HEATER ROOM	120	✓	1089C	04
8.	B4T2516	414	VA	008	AIFI	BEDROOM	949		1089D	05
9.	B4T2517	414	VA	0018	AIID	BEDROOM			1089E	06
10.					AI					07
11.					AI					
12.					AI					

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	Dust samples in floor vent
02	Cementitous fittings (each)
03	Same material as BT 253
04	Pipe insulation (Linear feet)
05	White vinyl flooring (all rooms) square feet
06	Pressed cardboard ductwork
07	Pipe insulation & fitting material sampled traverses across attic to bathroom (~6 fittings & 25 linear feet)

TECHNICIAN SIGNATURE _____

QUALITY ASSURANCE SIGNATURE _____

PATRICK HENRY #008



PATRICK HENRY, VA. FHA 3-BEDROOM

BLDG # 8

SITE # 44

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-[illegible]

FACILITY BLDG. NO. PATRICK HENRY FHA #013

FACILITY CONTACT Dave Organ TELEPHONE NUMBER 804-878-[illegible]

TECHNICIAN NAME L. Jaye SIGNATURE [signature]

TECHNICIAN NAME A. Busby SIGNATURE [signature]

TIME ARRIVED 1100 TIME DEPARTED 1130 DATE 23 Feb [illegible]
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

Unit #13 is 3-bedroom house with a pitched shingle roof and aluminum siding. Heat is forced air oil fire. Suspect pipe insulation on hot water pipes in heater room and attic. Dust samples and flooring samples also taken. This house was occupied during our inspection.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	9
Drawings Reviewed	N/A	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	3	Exp. Assess. Form Init.	✓
Q.A. Check ____	SIGNATURE ____	DATE 23 Feb 90 (dd mmm yy)	

ASBESTOS SURVEY DATA

0571

BLDG. NO.: 0113
INSTALLATION 044

TASK TEAM MEMBERS
L Lange
A Busby

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: PATRICK HENRY FHA
BLDG. DESCRIPTION: 3-br, pitch roof, alum siding

DATE (dd/mm/yy): 23/FEB/90
TIME ARRIVED: 1205

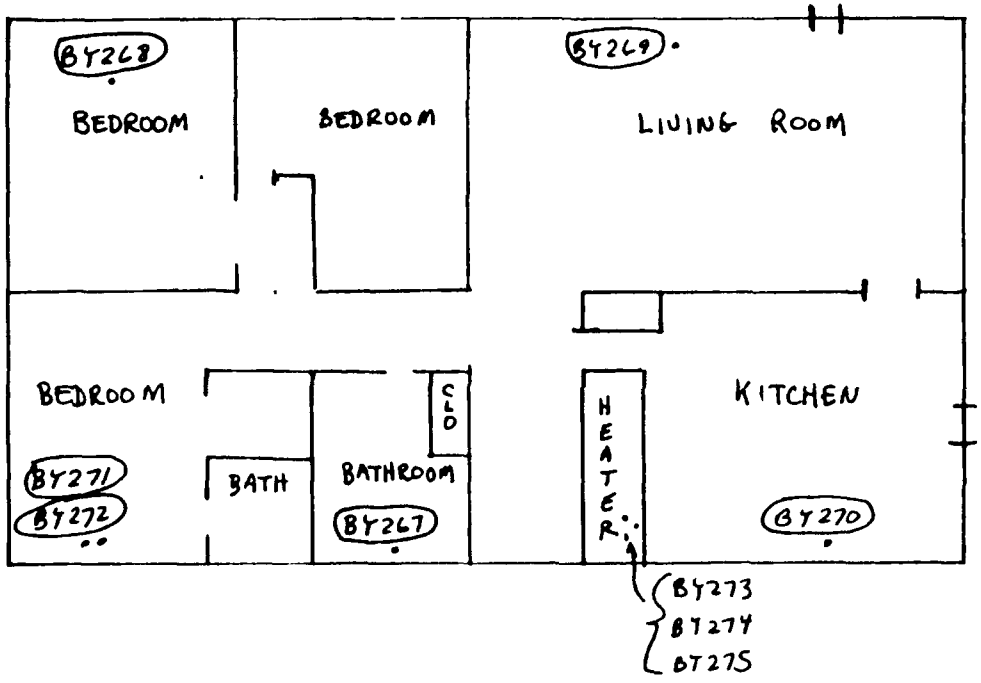
ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	B47267	44	VA	0113	AITD	BATHROOM	11		10911A	01
2.	B47268	44	VA	0113	AITD	BEDROOM	11		10911A	01
3.	B47269	44	VA	0113	AITD	LIVING ROOM	11		10911A	01
4.	B47270	44	VA	0113	AITD	KITCHEN	11		10911A	01
5.	B47271	44	VA	0113	AIFI	BEDROOM	949		10911B	02
6.	B47272	44	VA	0113	AITD	BEDROOM	11		10911C	03
7.	B47273	44	VA	0113	AIPI	HEATER ROOM	16	✓	10911D	04
8.	B47274	44	VA	0113	AIPI	HEATER ROOM	15	✓	10911E	05
9.	B47275	44	VA	0113	AIPI	HEATER ROOM	111	✓	10911E	06
10.					AI					07
11.					AI					
12.					AI					

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	Dust samples in fiber vents
02	White vinyl flooring all rooms (same type)
03	Pressed cardboard ductwork
04	Cementitous fitting (each)
05	Pipe insulation (Linear feet)
06	Same material as B47274
07	Pipe insulation and fittings in attic on water pipes servicing bathroom (= 6 fittings & 20 LF)

TECHNICIAN SIGNATURE

QUALITY ASSURANCE SIGNATURE

PATRICK HENRY # 013



PATRICK HENRY, VA. FHA 3-BEDROOM

BLDG # 13

SITE # 44

APPENDIX A.2. LABORATORY DATA, ASBESTOS SAMPLES

BULK SAMPLE ANALYSIS SUMMARY

Weston W.O. No. 2104-13-01-0000

Sample Number BY253 through Sample BY275

AO LAB ID NO	CLIENT/CLIENT ID	LOCATION	MATERIAL DESCRIPTION*	DATE RECEIVED	RESULTS** CH	AM	CR	OT	TL	LAYERS	ANALYST
BY253	44-VA-008-API	HEATRM	F, CEM FITTNG	03/01/90	ND	ND	ND	ND	ND	Yes	07323
BY254	44-VA-008-API	HEATRM	F, CEM FITTNG	03/01/90	ND	ND	ND	ND	ND	Yes	07323
BY255	44-VA-008-API	HEATRM	F, PIPE INSUL	03/01/90	10	ND	ND	ND	10	Yes	07323
BY256	44-VA-008-AFT	BEDRM	NF, WH, VINYL FLR	03/01/90	25	ND	ND	ND	25	No	07323
BY257	44-VA-008-ATD	BEDRM	F, CRDBD DUCT	03/01/90	ND	ND	ND	ND	ND	Yes	07323
BY262	44-VA-006-AFT	BEDRM	NF, WH, VINYL FLR	03/01/90	15	ND	ND	ND	15	Yes	07323
BY263	44-VA-006-ATD	BEDRM	F, CRDBD DUCT	03/01/90	ND	ND	ND	ND	ND	Yes	07323
BY264	44-VA-006-API	HEATRM	F, CEM FITT	03/01/90	ND	ND	ND	ND	ND	Yes	07323
BY265	44-VA-006-API	HEATRM	F, PIPE INSUL	03/01/90	2	ND	ND	ND	2	Yes	07323
BY266	44-VA-006-API	HEATRM	F, PIPE INSUL	03/01/90	2	ND	ND	ND	2	Yes	07323
BY271	44-VA-013-AFT	BEDRM	NF, WH, VINYL FLR	03/01/90	ND	ND	ND	ND	ND	No	07323
BY272	44-VA-013-ATD	BEDRM	F, CRDBD DUCT	03/01/90	ND	ND	ND	ND	ND	Yes	07323
BY273	44-VA-013-API	HEATRM	F, CEM FITT	03/01/90	ND	ND	ND	ND	ND	Yes	07323
BY274	44-VA-013-API	HEATRM	F, PIPE INSUL	03/01/90	2	ND	ND	ND	2	Yes	07323
BY275	44-VA-013-API	HEATRM	F, PIPE INSUL	03/01/90	1	ND	ND	ND	1	Yes	07323

* MATERIAL DESCRIPTION

Friable[1], Color[2], System[3], Type

** RESULTS

CH - Chrysotile
AM - Amosite
CR - Crocidolite
OT - Other
TL - Total

FRIABLE[1]

F - Friable
NF - Non-Friable

COLOR[2]

BK - Black
BL - Blue
BR - Brown
GR - Green
GY - Gray
RD - Red
TN - Tan
WH - White
YL - Yellow

SYSTEM[3]

CHW - Chilled Water
DOM - Domestic Water
HHW - Heating Hot Water
STM - Steam
UNK - Unknown

All analyses are performed in accordance with the methods set forth in U.S. EPA 600/M4-82-020, as ammended. Weston's Optical Microscopy Laboratory is accredited by the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program for asbestos fiber analysis (Laboratory Code 1254).

ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

Transmission Electron Microscopy
Asbestos Summary Report

Client: Argonne National Laboratories Weston W.O. No.: 2104-13-01-0000

Sample Type(s): Dust and Floor Tiles Sampling Location: Patrick Henry

QUALITATIVE ANALYSIS

FLOOR TILES: A 0.5 to 2.0 gram portion of each floor tile sample was ultrasonically disaggregated in four milliliters of deionized, 0.2 μm membrane filtered water. After the coarse fraction settled, a drop of the suspended, clay-sized fraction was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated for thermal stability in the electron beam and examined with a Philips CM12 transmission electron microscope operating at 120 kilovolts accelerating voltage.

DUST WIPE SAMPLES: A generous loading of dust was collected on a pre-wetted, 25 square centimeter section of a cleanroom wipe. The wipe was placed in a two ounce wide mouth collection vial and returned to the laboratory. Ten to fifteen milliliters of filtered, deionized water was added to suspend the dust. The suspension was ultrasonically dispersed and the coarse fraction was allowed to settle. A drop of the suspension was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated as above and examined by transmission electron microscopy at 120 kilovolts accelerating voltage.

ANALYTICAL RESULTS

SAMPLE IDENTIFICATION	RESULTS
BY249-44-VA-008-ATD	Positive
BY250-44-VA-008-ATD	Positive
BY251-44-VA-008-ATD	Positive
BY252-44-VA-008-ATD	Positive
BY258-44-VA-006-ATD	Negative
BY259-44-VA-006-ATD	Positive
BY260-44-VA-006-ATD	Positive

ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
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ANALYTICAL RESULTS
(continued)

SAMPLE IDENTIFICATION	RESULTS
BY261-44-VA-006-ATD	Positive
BY267-44-VA-013-ATD	Negative
BY268-44-VA-013-ATD	Positive
BY269-44-VA-013-ATD	Positive
BY270-44-VA-013-ATD	Positive
BY271-44-VA-013-AFT	Negative

Barry Rayfield
(Approved for Transmittal)

3/19/90
(Date)

* This test report relates only to the specific items tested.
** These sample results may only be reproduced in full, and are valid only if approved for transmittal.

APPENDIX B.1. FIELD DATA
AIRBORNE ASBESTOS SAMPLING

AIR MONITORING DATA

CLIENT Argonne Nat'l Lab WORKER ORDER NUMBER 2104-03-02

PROJECT LOCATION Patrick Henry VA. Unit 13

WORK AREA ID NO. _____ SAMPLE NO. PH-13-LR

SAMPLE TYPE

☐ PERSONNEL
NAME _____
TASK _____

☒ AMBIENT
☐ WORK AREA ☐ CLEAN ROOM
☐ ADJACENT ROOM ☐ AFD EXHAUST
☐ BACKGROUND
☒ OTHER Living Room Vent

☐ CLEARANCE
☐ INITIAL
☐ FINAL, REOCCUPANCY
☐ OTHER _____
☐ TWA SAMPLE (SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA), mm² ☐ 855 ☒ 385

PUMP ID. 70

PUMP Cal Initial 26 (no.) 11.4 (rate) 11.4 (Mean Flow) L/min

PUMP Cal Final 27 (no.) 11.3 (rate) 1710 (Sample Vol. (VA)) L

1134 (Time Began) 1405 (Time End) 151 (Sample Time) min

L. Nelms (Technician) 01 May 90 (Date)

ANALYTICAL DATA

ANALYST _____

Scope ID. _____ Microscopic Field Area (MFA) _____ mm²

Date/Time Mounted _____ Date/Time Counted _____

Total Fibers Counted _____ Total Fields Counted _____

Average Count _____ f/fld Blank Count _____ f/fld

Blank Corrected Count (BCC) _____ Fiber Density _____ f/mm²

Detection Limit (DL) _____ f/cc Concentration (C) _____ f/cc

$$C = \frac{(BCC)(FA)}{(VA)(MFA)(1000)}$$

DL = 10 fibers/100 fields

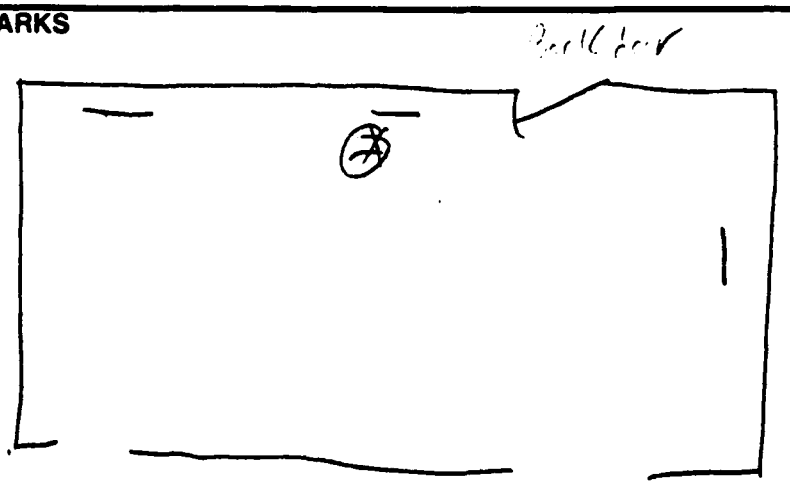
The above-reported results were obtained when the sample was counted in accordance with NIOSH 7400.

Signature _____ Date _____

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

NOTES/SKETCHES REMARKS

TEM



AIR MONITORING DATA

CLIENT Argonne Nat'l Lab WORKER ORDER NUMBER 2104-13-02

PROJECT LOCATION Patrick Henry VA Unit 13

WORK AREA ID NO. _____ SAMPLE NO. PH-13-K2

SAMPLE TYPE

☐ PERSONNEL
NAME _____
TASK _____

☒ AMBIENT
☐ WORK AREA ☐ CLEAN ROOM
☐ ADJACENT ROOM ☐ AFD EXHAUST
☐ BACKGROUND
☒ OTHER Kitchen Vent (wall-near ceiling)

☐ CLEARANCE
☐ INITIAL
☐ FINAL, REOCCUPANCY
☐ OTHER _____
☐ TWA SAMPLE (SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA), mm²: ☐ 855 ☒ 385

PUMP ID. 82

PUMP Cal Initial: 11.3 (no.) 19 (rate) 11.4 L/min (Mean Flow)

PUMP Cal Final: 11.4 (no.) 20 (rate) 1710 L (Sample Vol. (VA))

1133 Time Began | 1404 Time End | 151 min Sample Time

L. Nelms Technician | 01 May '10 Date

ANALYTICAL DATA

ANALYST _____

Scope ID _____ | Microscopic Field Area (MFA) _____ mm²

Date/Time Mounted _____ | Date/Time Counted _____

Total Fibers Counted _____ | Total Fields Counted _____

Average Count _____ f/fld | Blank Count _____ f/fld

Blank Corrected Count (BCC) _____ | Fiber Density _____ f/mm²

Detection Limit (DL) _____ f/cc | Concentration (C) _____ f/cc

$$C = \frac{(BCC)(FA)}{(VA)(MFA)(1000)}$$

DL = 10 fibers/100 fields

The above-reported results were obtained when the sample was counted in accordance with NIOSH 7400.

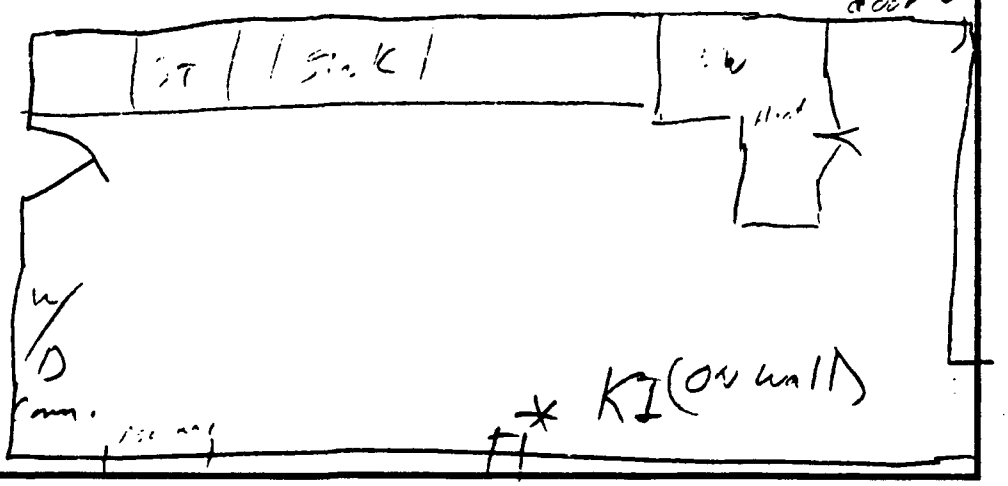
Signature _____ Date _____

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

NOTES/SKETCHES REMARKS

Vent High on wall - near ceiling

TEM



AIR MONITORING DATA

CLIENT Argonne Nat'l Lab WORKER ORDER NUMBER 2104-13-02

PROJECT LOCATION Patrick Henry VA Unit 13

WORK AREA ID NO. _____ SAMPLE NO PH-13-BR

SAMPLE TYPE

☐ PERSONNEL
NAME _____
TASK _____

☒ AMBIENT
☐ WORK AREA ☐ CLEAN ROOM
☐ ADJACENT ROOM ☐ AFD EXHAUST
☐ BACKGROUND
☒ OTHER Bedroom Vent

☐ CLEARANCE
☐ INITIAL
☐ FINAL, REOCCUPANCY
☐ OTHER _____
☐ TWA SAMPLE
(SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA), mm² ☐ 855 ☒ 385

PUMP ID. 78

PUMP Cal Initial 24 (no.) 8.2 (rate) 8.2 L/min (Mean Flow)

PUMP Cal Final 25 (no.) 8.1 (rate) 1220 L (Sample Vol. (VA))

1137 Time Began | 1407 Time End | 150 min Sample Time

L Nelms Technician | 01 May '96 Date

ANALYTICAL DATA

ANALYST _____

Scope ID _____ | Microscopic Field Area (MFA) _____ mm²

Date/Time Mounted _____ | Date/Time Counted _____

Total Fibers Counted _____ | Total Fields Counted _____

Average Count _____ f/fld | Blank Count _____ f/fld

Blank Corrected Count (BCC) _____ | Fiber Density _____ f/mm²

Detection Limit (DL) _____ f/cc | Concentration (C) _____ f/cc

$$C = \frac{(BCC)(FA)}{(VA)(MFA)(1000)}$$

DL = 10 fibers/100 fields

The above-reported results were obtained when the sample was counted in accordance with NIOSH 7400.

Signature _____ Date _____

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

NOTES/SKETCHES REMARKS

TEM

AIR MONITORING DATA

CLIENT Argonne Nat'l Lab WORKER ORDER NUMBER 2104-13-02

PROJECT LOCATION Patrick Henry VA. Unit 13

WORK AREA ID NO. _____ SAMPLE NO. PH-13-13A

SAMPLE TYPE

☐ PERSONNEL
NAME _____
TASK _____

☒ AMBIENT
☐ WORK AREA ☐ CLEAN ROOM
☐ ADJACENT ROOM ☐ AFD EXHAUST
☐ BACKGROUND
☒ OTHER Ba Hvac Vent Turn Near Ceiling

☐ CLEARANCE
☐ INITIAL
☐ FINAL, REOCCUPANCY
☐ OTHER _____
☐ TWA SAMPLE (SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA), mm² ☐ 855 ☒ 385

PUMP ID. 97

PUMP Cal Initial 25 (no.) 11.4 (rate) 11.4 (Mean Flow) L/min

PUMP Cal Final 26 (no.) 11.4 (rate) 1720 (Sample Vol. (VA)) L

11:35 (Time Began) 1406 (Time End) 151 (Sample Time) min

L. Nelms (Technician) 01 May 90 (Date)

ANALYTICAL DATA

ANALYST _____

_____ Scope ID.

_____ mm² Microscopic Field Area (MFA)

_____ Date/Time Mounted

_____ Date/Time Counted

_____ Total Fibers Counted

_____ Total Fields Counted

_____ f/fld Average Count

_____ f/fld Blank Count

_____ Blank Corrected Count (BCC)

_____ f/mm² Fiber Density

_____ f/cc Detection Limit (DL)

_____ f/cc Concentration (C)

$$C = \frac{(BCC)(FA)}{(VA)(MFA)(1000)}$$

DL = 10 fibers/100 fields

The above-reported results were obtained when the sample was counted in accordance with NIOSH 7400.

_____ Signature _____ Date

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

NOTES/SKETCHES REMARKS

TEM

AIR MONITORING DATA

CLIENT Argonne Nat'l Lab WORKER ORDER NUMBER 2104-13-02

PROJECT LOCATION Patrick Henry VA Unit [illegible]

WORK AREA ID NO. _____ SAMPLE NO. PH-13-06T

SAMPLE TYPE

☐ PERSONNEL
NAME _____
TASK _____

☒ AMBIENT
☐ WORK AREA ☐ CLEAN ROOM
☐ ADJACENT ROOM ☐ AFD EXHAUST
☒ BACKGROUND
☐ OTHER _____

☐ CLEARANCE
☐ INITIAL
☐ FINAL, REOCCUPANCY
☐ OTHER _____
☐ TWA SAMPLE
(SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA), mm² ☐ 855 ☒ 385

PUMP ID. 80

PUMP Cal Initial 23 (no.) 11.4 (rate) 11.4 (Mean Flow) L/min

PUMP Cal Final 24 (no.) 11.4 (rate) 1720 L (Sample Vol. (VA))

1132 Time Began | 1403 Time End | 151 min Sample Time

L. Nelms Technician | 01 May '96 Date

ANALYTICAL DATA

ANALYST _____

Scope ID _____ | Microscopic Field Area (MFA) _____ mm²

Date/Time Mounted _____ | Date/Time Counted _____

Total Fibers Counted _____ | Total Fields Counted _____

Average Count _____ f/fld | Blank Count _____ f/fld

Blank Corrected Count (BCC) _____ | Fiber Density _____ f/mm²

Detection Limit (DL) _____ f/cc | Concentration (C) _____ f/cc

$C = \frac{(BCC)(FA)}{(VA)(MFA)(1000)}$

DL = 10 fibers/100 fields

The above-reported results were obtained when the sample was counted in accordance with NIOSH 7400.

Signature _____ Date _____

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

NOTES/SKETCHES REMARKS

TEM

Outside on Driveway in front of outside Storage

AIR MONITORING DATA

CLIENT Argonne Nat'l Lab WORKER ORDER NUMBER 2104-13-02

PROJECT LOCATION Patrick Henry VA Unit 13

WORK AREA ID NO. _____ SAMPLE NO. PH-13-FB

SAMPLE TYPE

- ☐ PERSONNEL
  - NAME _____
  - TASK _____
- ☑ AMBIENT
  - ☐ WORK AREA
  - ☐ ADJACENT ROOM
  - ☐ BACKGROUND
  - ☑ OTHER Field Blank
  - ☐ CLEAN ROOM
  - ☐ AFD EXHAUST
- ☐ CLEARANCE
  - ☐ INITIAL
  - ☐ FINAL, REOCCUPANCY
  - ☐ OTHER _____
- ☐ TWA SAMPLE (SEE ADDITIONAL SHEETS)

SAMPLE DATA

Filter area (FA), mm²: ☐ 855 ☑ 385

PUMP ID. None

PUMP Cal Initial N/A (no.) _____ (rate) 0 L/min (Mean Flow)

PUMP Cal Final N/A (no.) _____ (rate) 0 L (Sample Vol. (VA))

1131 (Time Began) 1409 (Time End) _____ min (Sample Time)

L Nelms (Technician) 01 May '90 (Date)

ANALYTICAL DATA

ANALYST _____

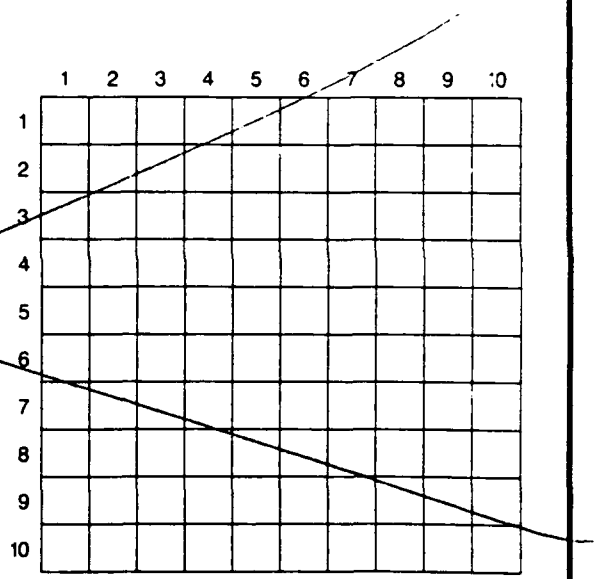
Scope ID.	Microscopic Field Area (MFA) mm²
Date/Time Mounted	Date/Time Counted
Total Fibers Counted	Total Fields Counted
Average Count f/fld	Blank Count f/fld
Blank Corrected Count (BCC)	Fiber Density f/mm²
Detection Limit (DL) f/cc	Concentration (C) f/cc

$$C = \frac{(BCC)(FA)}{(VA)(MFA)(1000)}$$

DL = 10 fibers/100 fields

The above-reported results were obtained when the sample was counted in accordance with NIOSH 7400.

_____ (Signature) _____ (Date)



NOTES/SKETCHES REMARKS

TEM

APPENDIX B.2. LABORATORY DATA
AIRBORNE ASBESTOS SAMPLING

ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: PH-13-LR

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: EF014

Received by: Greg Hall
Analyzed by: Barry Rayfield

Date Received: 05/02/90
Date Analyzed: 05/06/90

Filter Type: 0.45 µm, 25 mm, MEC
Number of Grids Examined: 2
Average Grid Square Area: 0.0088 mm²
Sample Volume: 1710.0 liters
EPA Analysis: AHERA

Filter Area: 385 mm²
Number of Grid Squares Examined: 6
Total Area Examined: 0.0528 mm²
Detection Limit: 0.00426 fibers/cc
Grid Archive No.: 0230-D-4,5

ANALYTICAL RESULTS

	Chrysotile		Amphiboles			
	<5µm	≥5µm	<5µm	≥5µm	Ambiguous	Non-Asbestos
Number of Fibers Analyzed:	0	0	0	0	0	0
Number of Bundles Analyzed:	0	0	0	0	0	0
Number of Clusters Analyzed:	0	0	0	0	0	0
Number of Matrices Analyzed:	0	0	0	0	0	0

SUMMARY

Concentration of Asbestos Structures < 5µm in length: ND (structures/cc)

Concentration of Asbestos Structures ≥ 5µm in length: ND (structures/cc)

Concentration of Asbestos Structures < 5µm in length: ND (structures/mm²)

Concentration of Asbestos Structures ≥ 5µm in length: ND (structures/mm²)

Total Concentration of Asbestos Structures ND (structures/cc)

Total Concentration of Asbestos Structures ND (structures/mm²)

Comments:

Barry Rayfield
(Approved for Transmittal)

May 7, 1990
(Date)

This test report relates only to the specific items tested.

ROY F. WESTON, INC
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE (205) 826-6100
FAX (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: PH-13-KI

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: EF015

Received by: Greg Hall
Analyzed by: Barry Rayfield

Date Received: 05/02/90
Date Analyzed: 05/06/90

Filter Type: 0.45 µm, 25 mm, MEC
Number of Grids Examined: 2
Average Grid Square Area: 0.0088 mm²
Sample Volume: 1710.0 liters
EPA Analysis: AHERA

Filter Area: 385 mm²
Number of Grid Squares Examined: 6
Total Area Examined: 0.0528 mm²
Detection Limit: 0.00426 fibers/cc
Grid Archive No.: 0230-E-1,2

ANALYTICAL RESULTS

	Chrysotile		Amphiboles			
	<5µm	≥5µm	<5µm	≥5µm	Ambiguous	Non-Asbestos
Number of Fibers Analyzed:	0	0	0	0	0	0
Number of Bundles Analyzed:	0	0	0	0	0	0
Number of Clusters Analyzed:	0	0	0	0	0	0
Number of Matrices Analyzed:	0	0	0	0	0	0

SUMMARY

Concentration of Asbestos Structures < 5µm in length: ND (structures/cc)

Concentration of Asbestos Structures ≥ 5µm in length: ND (structures/cc)

Concentration of Asbestos Structures < 5µm in length: ND (structures/mm²)

Concentration of Asbestos Structures ≥ 5µm in length: ND (structures/mm²)

Total Concentration of Asbestos Structures ND (structures/cc)

Total Concentration of Asbestos Structures ND (structures/mm²)

Comments:

(Approved for Transmittal)

May 7, 1990
(Date)

This test report relates only to the specific items tested.

ROY F WESTON, INC
1635 PUMPHREY AVE
AUBURN, AL 36830
PHONE (205) 826-6100
FAX (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: PH-13-BR

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: EF016

Received by: Greg Hall
Analyzed by: Barry Rayfield

Date Received: 05/02/90
Date Analyzed: 05/06/90

Filter Type: 0.45 μm, 25 mm, MEC
Number of Grids Examined: 2
Average Grid Square Area: 0.0088 mm²
Sample Volume: 1220.0 liters
EPA Analysis: AHERA

Filter Area: 385 mm²
Number of Grid Squares Examined: 8
Total Area Examined: 0.0704 mm²
Detection Limit: 0.00448 fibers/cc
Grid Archive No.: 0230-E-4.5

ANALYTICAL RESULTS

	Chrysotile		Amphiboles			
	<5μm	≥5μm	<5μm	≥5μm	Ambiguous	Non-Asbestos
Number of Fibers Analyzed:	0	0	0	0	0	0
Number of Bundles Analyzed:	0	0	0	0	0	0
Number of Clusters Analyzed:	0	0	0	0	0	0
Number of Matrices Analyzed:	0	0	0	0	0	0

SUMMARY

Concentration of Asbestos Structures < 5μm in length: ND (structures/cc)

Concentration of Asbestos Structures ≥ 5μm in length: ND (structures/cc)

Concentration of Asbestos Structures < 5μm in length: ND (structures/mm²)

Concentration of Asbestos Structures ≥ 5μm in length: ND (structures/mm²)

Total Concentration of Asbestos Structures ND (structures/cc)

Total Concentration of Asbestos Structures ND (structures/mm²)

Comments:

Barry Rayfield
(Approved for Transmittal)

May 7, 1990
(Date)

This test report relates only to the specific items tested.

ROY F. WESTON, INC.
1635 PUMPHREY AVE.
AUBURN, AL 36830
PHONE: (205) 826-6100
FAX: (205) 826-8232

TRANSMISSION ELECTRON MICROSCOPY ASBESTOS ANALYSIS REPORT

Client: ARGONNE
Client Sample ID: PH-13-BA

Weston W.O. No.: 2104-13-02-0000
Weston Sample ID No.: EF017

Received by: Greg Hall
Analyzed by: Barry Rayfield

Date Received: 05/02/90
Date Analyzed: 05/06/90

Filter Type: 0.45 μm, 25 mm, MEC
Number of Grids Examined: 2
Average Grid Square Area: 0.0088 mm²
Sample Volume: 1720.0 liters
EPA Analysis: AHERA

Filter Area: 385 mm²
Number of Grid Squares Examined: 6
Total Area Examined: 0.0528 mm²
Detection Limit: 0.00424 fibers/cc
Grid Archive No.: 0230-A-8,9

ANALYTICAL RESULTS

	Chrysotile		Amphiboles			
	<5μm	≥5μm	<5μm	≥5μm	Ambiguous	Non-Asbestos
Number of Fibers Analyzed:	0	0	0	0	0	0
Number of Bundles Analyzed:	0	0	0	0	0	0
Number of Clusters Analyzed:	0	0	0	0	0	0
Number of Matrices Analyzed:	0	0	0	0	0	0

SUMMARY

Concentration of Asbestos Structures < 5μm in length: ND (structures/cc)

Concentration of Asbestos Structures ≥ 5μm in length: ND (structures/cc)

Concentration of Asbestos Structures < 5μm in length: ND (structures/mm²)

Concentration of Asbestos Structures ≥ 5μm in length: ND (structures/mm²)

Total Concentration of Asbestos Structures ND (structures/cc)

Total Concentration of Asbestos Structures ND (structures/mm²)

Comments:

Barry Rayfield
(Approved for Transmittal)

May 7, 1990
(Date)

This test report relates only to the specific items tested.

APPENDIX C. SUPPORTING DATA - TRANSFORMER OILS

POWER SYSTEMS ANALYSIS, INC.
8095 GOODRICH ROAD, S.W. . P.O. BOX 327 . NAVARRE, OHIO 44662
(216) 756-2444

TRANSFORMER INSPECTION & TEST REPORT

SAMPLE DATA SHEET

JOB NO. FE-E-1232-88
TEST NO. 877

CUSTOMER Fort Eustis -- Newport News, VA
DATE OF TEST 4-16-89

LOCATION PATRICK HENRY
TESTED BY JM

TRANSFORMER INFORMATION:
Location or No. PATRICK-HENRY

Manufacturer WEST
KVA 100
Phase 1
Hz. 60

Serial No. 59AL2839
Type PAD (POLE)

TYPE OF SAMPLING:
SYRINGE
DIP X
OTHER

Primary Voltage [ ] Δ [ ] Y

Secondary Voltage [ ] Δ [ ] Y

Coolant (Check) [X] Oil [ ] Askarel [ ] Air [ ] Nitrogen [ ] Other

Coolant Capacity 24 Gallons
Impedance 1.4

VISUAL INSPECTION

BUSHINGS
LEAKS
TAP CHANGER
FANS & CONTROLS
GAS REGULATOR
PAINT
OTHER

GAUGES:
TEMP.
PRES/VAC PSI
LIQUID LEVEL

ANALYSIS DATE	SAMPLE ID#	PCB CONCENTRATION PPM	MOISTURE CONCENTRATION PPM	AROCLOR
	977	[redacted] 60.0	38.0	1262

COMMENTS:

D.O.W.

PSA/Form No/88-0